



CHALLENGE LEVEL

MIXING WHITE LIGHT

MATERIALS AND EQUIPMENT

- an adult helper
- 3 lightsticks: one red, one green, and one blue
- small glass dish
- hammer
- nail
- work gloves
- a glass or jar

What happens when you mix light? White light can be broken up into a spectrum of seven colors, but to mix it you need only three colors—red, green, and blue. These three colors are known as the light primary colors (when you mix paints, which don't emit but absorb light, the three primaries are red, yellow, and blue). Have fun using lightsticks to mix your own white light.

Method of Investigation

NOTE: Since you will be opening lightsticks, you must have an adult helper.

- 1 Activate the lightsticks. Notice that the blue is less intense than the green or the red.
- 2 Put on a pair of work gloves. Make a hole in the end of each lightstick with a nail and hammer. Keep the lightsticks, hole end up, in a glass or jar. **Note:** The material in lightsticks is nontoxic; however, it may irritate your skin or eyes, and it may stain your clothing. Please handle it carefully and dispose of it safely in a refuse container.
- 3 Turn the blue lightstick upside down over a small

glass dish and shake out about ten drops of glowing fluid.

- 4 Add a few drops of green to the blue and swirl the dish to mix.
- 5 Add red one drop at a time, mixing by swirling between drops.

Observations & Suggestions

Try mixing just green and red and see what happens. Figure out a formula for white light using all three colors. How many drops of each color do you need to produce white light? I found that red was the strongest color so I needed less of it.



Key Words: additive primary colors • mixing light

Vanishing Rainbow

It's exciting to see a rainbow, but here we're going to show you how to make one disappear!

YOU WILL NEED

Colored
crayons



White
cardstock



Scissors



Ruler



Wooden skewer



Lump of
adhesive putty



1

Draw a circle on a sheet of white cardstock and cut it out. With the help of a ruler, draw eight sections on it, like the slices of a pie.

2

Color the sections in this order: red, orange, yellow, green, blue, **indigo**, and violet. Leave the last section white.

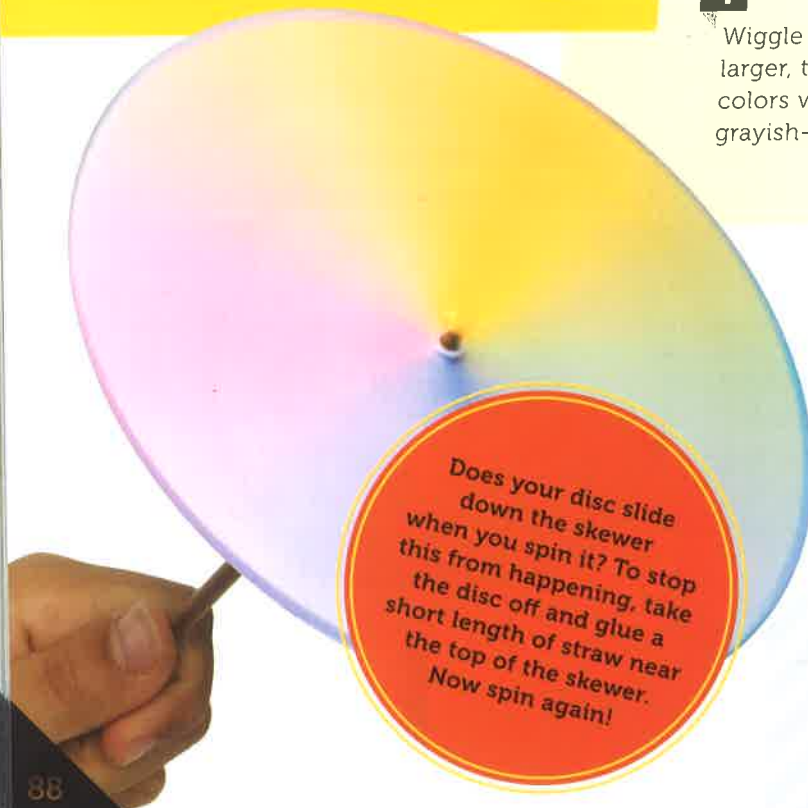


3

Put a lump of adhesive putty on a table, then place the center of the disc on the putty. Poke a wooden skewer through the center into the putty to make a hole.

4

Wiggle the skewer to make the hole slightly larger, then spin the disc on the skewer. The colors will disappear and all you'll see is grayish-white. The rainbow has vanished!



Does your disc slide down the skewer when you spin it? To stop this from happening, take the disc off and glue a short length of straw near the top of the skewer. Now spin again!



THE SCIENCE: LIGHT AND COLOR

White light is a combination of all the other colors that we can see (the **visible spectrum**). When you spin the wheel fast, your eyes can't distinguish the separate colors. What they see is all the colors blended to a grayish-white.